



Disturbance - Vegetation Breakout Report
or

Multi-Disturbance Synthesis
or

We're All Kinds of Disturbed!!

1)Types of disturbance



2)Insect disturbance – recovery patterns



3)Data



4)Synthesis

1) Types of disturbance

- Contribution of fire to G / B trends, being worked on
- Many unknowns about leftover G / B signal, and how it's related to other disturbances
- 'Holy grail' for G / B would be attribution of significant signal everywhere
- Major focus thus far on fire, let's expand our horizons. Other disturbances = knowledge gap
- Pests
- Retrogressive thaw slumps = big deal in NWT, alder where forests used to be
- Wind / storm damage
- Inundation / hydrologic change
- Anthropogenic (logging, fuel mitigation, roads, oil sands, other)
- Drought-induced productivity declines (not exactly disturbance, but can act like one)

2) Insect disturbance – recovery dynamics

- More so than fires, there is a gradient in severity & impacts
- Mixed forests and diversity contribute to capacity to be resistant & resilient = not leading to state shifts
- Continuous or combination of disturbances much worse, can push to threshold
- Example of white spruce forests in south-central AK transitioning to grasslands after spruce beetle attack b/c of higher fire frequency

3) Data

- Elizabeth Campbell has data on recovery from spruce beetle
- Woodcock / Wang Landsat products
 - Now mapping fire, insect, harvest, 'other'
 - Acknowledgement this will be a great advance over existing (CanLad, which doesn't have insect). Aerial polygons are imprecise, not systematic, and do not quantify level of infestation consistently
 - Harder to verify, but could produce change in greenness & wetness for forests that remain forest. Multiple uses (verify predictive biomass modeling)
 - Could extend change detection to non-forest (tundra)
- E. Campbell: tree ring database being compiled across Canada, could be really useful for ABoVE to relate forest dynamics to RS. Not much work currently in this space (Boyd exception). Might be issue with sampling dates, but will be publicly accessible w/in a year. Thousands of records. Also good # from AK (FIA, BNZ-LTER, CAFI?)
- Paul Montesano: really need to associate w/changes in structure. Time series of ASTER elevation / surface data. ~20y record of thermal and SWIR, systematic, have used for glacier changes. Underutilized. Maybe also ArcticDEM time series. Need to consider vertical resolution
- JJ Frost: declassified imagery 1972-1985 could be useful to understand pre-Landsat 5. Abundant and many stereo. But analog and has to be requested. Both AK and Canada. In AK generating big ortho mosaic for coastal areas to be released. Uses = shrub expansion, changes in heights, veg type, water extent
- Others = Yukon air photos (Isla M-S), back to 1940s in NWT (but not good quality)
- Adrianna F: major data / knowledge gaps for modeling insects = tree susceptibility to attack (long-term decline from moisture stress?), what determines whole stand mass attacks, what impacts spread, what are recovery patterns. Microclimate, topography, host availability. Need multi-scale understanding

4) Synthesis



4) Synthesis

- Collective intense group brain firestorm
- Work towards conceptual models of different disturbances
- Lacking paper on NHL disturbances, how they differentially impact landscapes, interactions, where going in the future
- Not data driven, conceptual, but w/case studies and maybe pulling from Curtis / Wang data
- Insects, fires, logging, thermokarst, veg-cryoturbation in tundra
- A priori what to expect from G / B perspective, end points, testing w/data that brings in scaling relationships
- Hypothesized trajectories, maybe time series data to support / refute
- Interactions b/n disturbances, interactions w/moisture & drought stress, interactions w/latitude & climate, interactions w/climate change
- Knowns and unknowns
- Infographics

Exhaustion...

Post-disturbance recovery...

Awkward question of who will lead...

Awkward silence...

Adrianna!!



4) Synthesis

- Will form ad hoc working group.
- Workshop to come up with figures, key points, section leads
- Adrianna convening disturbance interaction session at AGU